Vol. 18. Parts 1 & 2.

Rubber Research Scheme (Ceylon)

First & Second Quarterly Circulars for 1941.

June, 1941.

H. W. CAVE & CO., PRINTERS

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DARTONFIELD ESTATE—VISITORS' DAYS

The second and *fourth* Wednesdays in each month have been set aside as Visitors' Days at Dartonfield Estate, and the services of technical officers will be available to visitors on those days. The estate superintendent will be available every Wednesday. Visitors are requested to arrive on the estate not later than 9.30 a.m.

While visitors will be welcomed at the Station on other days, any particular member of the staff may not be free to give them attention unless an appointment has been made.

Dartonfield Estate is situated about 3½ miles from the main Matugama-Agalawatta Road, the turn-off being near culvert No. 14/10. The distance from Colombo is approximately 47 miles.

PUBLICATIONS

Rubber Research Scheme publications comprising Annual Reports, Quarterly Circulars and occasional Bulletins and Advisory Circulars are available without charge to the Proprietors (resident in Ceylon), Superintendents and Local Agents of Rubber estates in Ceylon over 10 acres in extent. Forms of application for registration may be obtained from the Director. Extra copies of publications can be supplied to the Superintendents of large estates for the use of their assistants.

ADVISORY CIRCULARS

The former issue of cyclo-styled Planting Memoranda have been replaced by printed Advisory Circulars. The undernoted Circulars may be obtained on application at 25 cents per copy. Future issues in the series will be sent free of charge to estates registered for the receipt of our publications :—

(1) Notes on budgrafting procedure.

(2) Programme of manuring for replanted Rubber clearings **(May, 1940).**

(3) Notes on Rubber seedling nurseries (November, 1939).

(4) Contour lining, holing and filling, cutting of platforms, trenches and drains (June, 1939).

(5) Straining box for latex (January, 1940).

(6) Notes on the care of budded trees of clone Tjirandji 1 with special reference to wind damage (September, 1938).

(7) Notes on procedure and equipment at Dartonfield Estate factory (May, 1940).

(8) Planting and after-care of budded stumps (January, 1940).

(9) The preparation of latex for shipment (May, 1940).

(10) Root disease in replanted areas (August, 1939).

(11) Emergency rubber coagulants (May, 1940).

(12) Warm air drying house for crepe rubber (May, 1940).

(13) Notes on the preparation of clean rubber (May, 1940).

(14) Rat Control (September, 1940).

FIELD EXPERIMENTS ON DARTONFIELD ESTATE—XIV.

MANURING EXPERIMENT WITH MATURE RUBBER (1940.)

L. A. WHELAN, *Soil Chemist*
and
C. A. de SILVA, *Assistant Botanist*

This paper summarises the yield records and growth measurements for the fourth year of a manurial experiment on Dartonfield Estate.

The scope and design of the experiment and the statistical methods employed were described in the *Quarterly Circulars* Vol. 13 (1936) Parts 2 and 3 and Vol. 15 (1938), Part 1, and are very briefly referred to below.

Treatments

THE fertiliser treatments are : N, NP, NK, NPK and O (no manure). Manures were applied in December, 1936, December, 1937 and March, 1939, at the rate $N = P_2O_5 = K_2O_5 =$ 0.4 lb. per tree. In 1940 it was decided to change to a biennial system of manuring in order to bring the treatments more into line with general estate practice. No manure was applied in that year, but in March, 1941 manuring was carried out at double the above rate. The basic doses per tree from which the mixtures were made up were 3.88 lbs. Sulphate of Ammonia (N), 2.71 lbs. Saphos phosphate (P) and 1.60 lbs. Muriate of potash (K). A comparison has also been made of two methods of applying the manure, broadcasting and forking, the cover where it occurs being left undisturbed.

Results

Yield.—Table I gives the yields in kilograms of dry rubber per plot of 20 trees.

That considerable variations not due to experimental manuring occur between plots is shown by the 1936 preliminary yields. These yield figures provide a basis on which subsequent experimental yields can be adjusted by means of a statistic known as the "regression coefficient." By this mathematical device a correction for variations in plot yields not due to experimental manuring may be made, and a more precise figure obtained for the response to manuring.

The actual yields for the years 1936 and 1940 have been included as well as the adjusted yields for 1937, 1938, 1939 and 1940.

To obtain the approximate values for pounds per acre each figure should be multiplied by 11. The figures in brackets give the adjusted yields as percentages of the unmanured plots.

TABLE I

MEAN YIELD IN KILOGRAMS DRY RUBBER PER PLOT OF 20 TREES

Treatment	Actual Yield		Adjusted Yield			
	1936	1940	1937	1938	1939	1940
N	53.4	45.0	49.8 (111)	56.9 (114)	44.5 (112)	44.6 (111)
NP	52.3	41.5	47.5 (106)	52.9 (106)	41.5 (104)	42.0 (104)
NK	55.5	46.6	49.1 (110)	56.5 (113)	44.1 (111)	44.6 (111)
NPK	56.5	50.2	49.6 (111)	59.3 (119)	46.6 (117)	47.4 (118)
O	47.1	35.6	44.8 (100)	50.0 (100)	39.7 (100)	40.3 (100)
Mean	53.0	43.8	48.2	55.1	43.3	43.8
Standard Error			1.2	1.8	not	1.5
Significant Difference (P=.05)			3.5	5.3	significant	4.3

It will be seen that the means for 1939 and 1940 are lower than those for the earlier years of the experiment. This may largely be ascribed to the decrease in the number of tappings brought about by the unfavourable weather conditions of 1939 and 1940. No "double tapping" is undertaken to compensate for the loss of crop in wet weather.

In 1937, 1938 and 1940 the manured plots N, NK and NPK all showed a significant increase (20:1 probability) when compared with the unmanured plots. The response to NP was not significant and this, taken in conjunction with the significant superiority of NPK over NP, suggests that potash should be included in a nitrogen-phosphate mixture. The relative values of N alone and an NPK mixture are discussed later.

The 1939 figures just failed to pass the conventional 20 : 1 test for statistical significance, but the trend of the responses to manures is apparently the same as in the other years.

The figures indicate that in the first year of manuring a significant response was obtained, in the second this was increased slightly and in succeeding years has been barely maintained.

The yields given in Table I have been converted to pounds per acre and are shown graphically in the figure facing page 8.

Method of Applying the Manure.—The figures for the comparison between broadcasting and envelop forking the manure are given in Table 2.

TABLE II

MEAN YIELD IN KILOGRAMS DRY RUBBER PER PLOT OF 20 TREES

Treatment	Adjusted Yields			
	1937	1938	1939	1940
Manure Broadcast ...	48.5	55.1	43.4	44.0
Manure Forked in ...	47.8	55.1	43.2	43.5
Mean ...	48.2	55.1	43.3	43.8

The results to date show no significant difference in yield between the two methods of application. On the basis of present evidence, broadcasting would therefore be given preference as being the cheaper. This conclusion refers only to inorganic fertilisers, as used in this experiment.

Girth Increment.—The girth of every tree was measured at a height of 4 ft. from the ground. The mean figures for annual increments for the different treatments in the years 1937 to 1941 inclusive are given in Table III.

TABLE III

ANNUAL GIRTH INCREMENTS

Treatment	Girth in inches 1937	Increment				Total Increment 1937-1941
		1937-1938	1938-1939	1939-1940	1940-1941	
N	35.76	.56	.21	,19	.41	1.37
NP	37.32	.63	.18	.17	.44	1.42
NK	39.19	.62	.16	.10	.43	1.31
NPK	37.10	.64	.23	.14	.37	1.38
O	33.78	.55	.21	.15	.29	1.20
Mean	36.63	.60	.20	.15	.39	1.34

The differences in girth increment between differently manured plots are not statistically significant. It is of interest to note that the mean increment for the year 1940 is substantially greater than that for either of the two previous years. The better growth is probably due to the less severe attack of Oidium in 1940 and the better refoliation in that year.

Bark Renewal.—The results of measurements taken in January of each year of the experiment are given in Table 4.

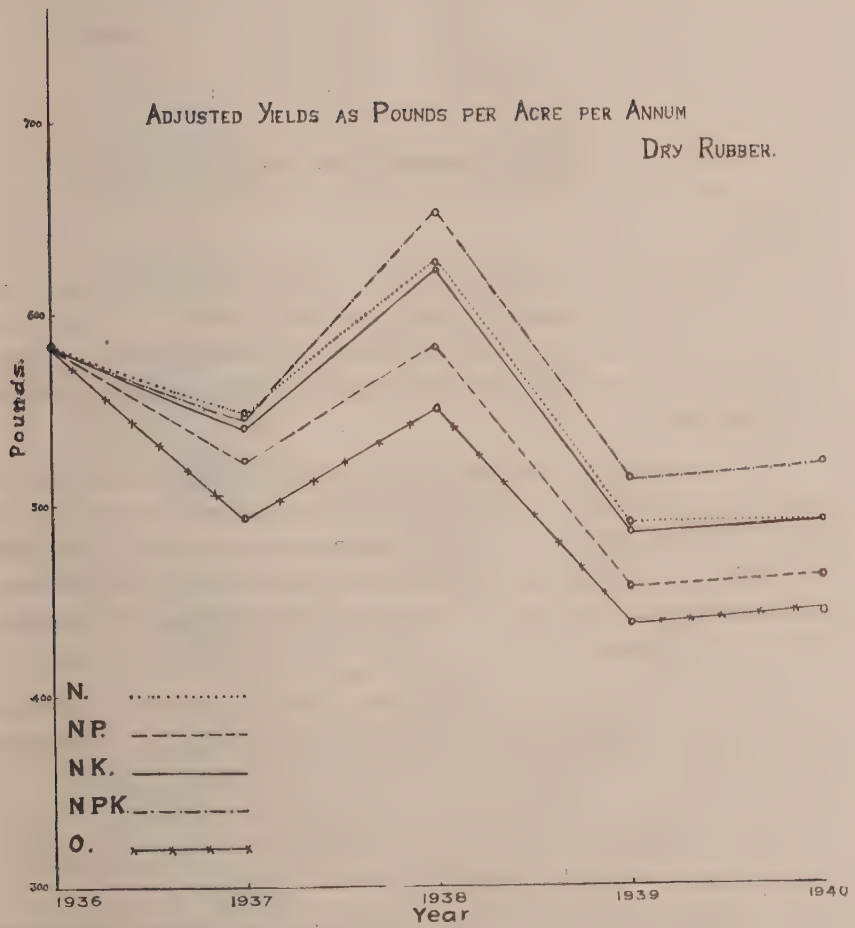
TABLE IV

THICKNESS OF RENEWED BARK IN MILLIMETRES.

Treatment	1937 (1 year renewal)	Annual Increments			Renewal in four years 1937-1941
		1938	1939	1940	
N	4.8	0.5	0.7	1.4	7.4
NP	4.7	0.9	0.5	1.5	7.6
NK	4.8	0.6	0.6	1.4	7.4
NPK	4.8	0.8	0.7	1.3	7.6
O	4.9	0.6	0.6	1.4	7.5
Mean	4.8	0.7	0.6	1.4	7.5

The small differences between treatments are not significant.

The indications of better growth in 1940, mentioned under girth increments, are reflected in the above bark renewal figures.


ADJUSTED YIELDS AS POUNDS PER ACRE PER ANNUM
DRY RUBBER.
Pounds.
700
600
500
400
300
N.
NP.
NK.
NPK.
O.
1936
1937
1938
1939
1940
Year

The figures given refer to renewal measured from the start of the experimental manuring. It was thought that measurements of bark tapped after several applications of manure had been given might indicate renewal differences not shown by the earlier series. Points were marked at the tapping level in February, 1940 and measurements were taken in January, 1941. The mean renewal for each treatment was :—

N	NP	NK	NPK	O	Mean
5.1	5.5	5.2	5.4	5.4	5.3

Difference between treatments are not significant and there is no indication that manuring has caused an increase in bark renewal.

Economic Aspect of Manuring.—In this paper the assumption is made that the additional yield can be marketed ; under conditions of artificial restriction the following considerations may not be applicable and the long view must be taken of the economics of manuring.

It is considered unwise to draw definite and too general conclusions from a single experiment which has been in progress for only 4 years and in which the random arrangement of the plots is somewhat unfortunate. With these limitations in mind a comparison of the cost of manuring with the return from the additional yield is of interest.

In this comparison, manures are priced at the pre-war figures : Sulphate of ammonia Rs. 141, Saphos phosphate Rs. 72 and Muriate of potash Rs. 140 per ton. Transport is allowed for at the rate of Rs. 10 per ton. Since there is no difference in yield between broadcasting and forking in the manure, application is charged for on the former system at the rate of Re. 1 per acre.

A mean value for the price of Crepe and Sheet rubber over the period 1937-1940 is taken at 46.82 cents per pound. From this must be deducted cost of transport and the additional cost of those items of manufacture that would be affected by crop increase of the order shown, giving a nett figure of approximately 44.8 cents per pound. The yearly yields are not treated individually but a mean annual value is used for the additional yield from each manurial treatment over the whole period.

TABLE V

ECONOMICS OF MANURING

Manure	Amount per tree per year	Amount per acre per year (100 trees)	Cost of mixture per ton	Cost per acre including transport and application	Additional Return Dry Rubber per acre per year	Value of additional return	Profit
		lbs.	Rs.	Rs.	lbs.	Rs.	Rs.
N	1.94 lbs. Ammonium Sulphate	194	141/-	14.08	57.5	25.76	11.68
NP	1.94 lbs. Ammonium Sulphate 1.36 lbs. Saphos	330	112·54	19.05	25.1	11.24	-7.81
NK	1.94 lbs. Ammonium Sulphate 0.80 lbs. Muriate of Potash	274	140.70	19.61	53.8	24.10	4.49
NPK	1.94 lbs. Ammonium Sulphate 1.36 lbs. Saphos 0.80 lbs. Muriate of Potash	410	117.90	24.41	77.3	34.63	10.22

It may be pointed out that the additional yield of 19.8 lbs. apparently due to the addition of PK to N alone has no statistical backing (see Table I) but even were this increase a real one, the profit on the extra yield due to the addition of PK is less than the cost of the additional manure.

There is, therefore, some evidence that the broadcasting of 200 lbs. Sulphate of ammonia (containing 40 lbs. nitrogen) per acre per annum has given an economic return, but the addition of the same amount of phosphoric acid and of potash has not been justified by results to date. The possibility that smaller amounts of phosphate and potash, as generally contained in normal estate mixtures, may be economically justified should, however, be kept in mind.

On this area, Saphos phosphate has considerably improved the growth of Pueraria. A similar result might however have been obtained from a much smaller dose, such as the 70 lbs. every fourth year in our general recommendations for the manuring of mature Rubber.

Summary

1. An experiment on Dartonfield Estate to determine the manurial requirements of mature Rubber is briefly described.

2. The results for the years 1937 to 1940 inclusive are given in terms of yield, girth increment and bark renewal.

3. When compensation is made for the initial difference shown by the uniformity trial of 1936, the manured plots are seen to have given statistically significant higher yields than the unmanured.

4. An NPK mixture has given a better yield than an NP mixture.

5. Manuring has had no effect on girth increment or bark renewal.

6. The broadcasting of 200 lbs. Sulphate of ammonia per acre per annum has proved profitable at the pre-war price of the manure, but the addition of 136 lbs. Saphos phosphate and 80 lbs. Muriate of potash to the nitrogen has not increased the economic advantage.

CEYLON CLONES—IX (1940)

C. E. FORD, *Geneticist*

Foreword

IN this article the 1940 results of test tapping Ceylon clones on the Rubber Research Scheme's Experiment Station at Nivitigalakele, and on Millakande and Stennes estates are reported.

Acknowledgment is made to those proprietors who have again kindly given permission for the publication of the yield records of clones established from mother trees on their properties.

Presentation of Results and Notes on Tables

The data are presented in five tables, largely self explanatory, and of essentially the same form as those published in last year's report. The following notes are given in the way of commentary and in order to supplement the information given in the column headings.

Tables I and II.—In these two tables the yield records of those clones which up to the present have shown the greatest promise are brought together.

In *Table III* the yields of Ceylon clones are compared with those of imported clones growing under approximately similar conditions. The comparison is far from a rigorous one but it may be concluded that the best Ceylon clones are capable of yields of the same order as those of several widely planted imported clones.

Tables IV and V summarise the 1940 yield records of all clones at Nivitigalakele in test tapping (S/2, d/2, 100%) and semi-commercial tapping (2S/2, d/4, 100%) respectively. In order to facilitate comparison the yields are expressed in pounds per tree per

130 tappings in Table IV and in the equivalent pounds per tree per 65 tappings in Table V. Here again it is necessary to point out that the comparison between clones is not rigorous, even within fields, owing to the fact that there is no replication. With the exception of Field 4A, the clones are planted in single blocks of about 25 trees each with the inevitable result that some blocks are better situated than others.

Selection of Trees for Test Tapping.—The test tapped trees of Hillcroft 55 on Stennes, and all clones except Millakande 3/2 and those in Field 4A at Nivitigalakele, constitute random samples of the original grafts. The test tapped trees of Hillcroft 28 on Stennes and of all clones on Millakande are probably above the average of the block in girth, while those of Millakande 3/2 at Nivitigalakele are among the largest in the block. In Field 4A all trees above 18 inches in girth at 3 feet from the union at the commencement of the tapping year (March, 1940) were tapped.

Tapping.—Except where otherwise stated all test tapping is on S/2, d/2, 100%. The trees in commercial tapping at Nivitigalakele were changed to the 2S/2, d/4, 100% system in March, 1940. Test tapping yields are in every case recorded only from those trees which were tapped continuously throughout the tapping year to which the yields refer. The tapping year is in every case the calendar year given in the tables except for year 1940 at Nivitigalakele, which refers to the period March, 1940 to February, 1941. The change was made in order to facilitate recording and computation and has the advantage of being a more natural interval (from one wintering period to the next).

Determination of Age.—In all cases age is determined from the time of budding or planting to the middle of the tapping year.

Girth Measurements.—All girth measurements were taken in inches at 3 feet above the union in January, 1940 (Nivitigalakele), and June, 1940 (Stennes and Millakande). Mean girth figures given in the tables are derived only from those trees tapped throughout the year.

Seedling Controls at Nivitigalakele.—The 1926, 1927, and 1928 clearings at Nivitigalakele were planted with seed-at-stake or ordinary seedling stumps and the "seedling controls" are plots of these original seedlings which have been left unbudded. In the 1926 clearing and Field 3A of the 1928 clearing, seed from selected

mother trees was used, whereas ordinary unselected seed was used in 1928 clearing Field 4A. Budding was delayed in many cases and so the seedlings have an advantage of from one to three years in age over the buddings.

Notes on Individual Clones

Very full notes on clones Millakande 3/2, Hillcroft 28, and Wagga 6278 were given in the last report of this series ; reference here will be mainly to fresh developments of interest.

Millakande 3/2.—The actual yield per tree for the year of the ten trees in test tapping on Nivitigalakele was 16.7 lbs., representing a satisfactory increase of 1.1 lbs. per tree over the 1939 figure. The balance trees of the clone, which had been tapped commercially in 1939, were utilised for a small scale tapping experiment in June, 1940 to compare the S/2, d/2, 100%; S/3, d/2, 67%; and 2S/2, d/4, 100% systems. Prior to the commencement of the experimental tapping all trees had been test tapped for three months on the standard S/2, d/2, 100% system. The mean yield per tree of the 44 trees tapped throughout the year on 100% intensity, including the original test tapped trees, was 11.3 lbs.

The yield in pounds per tree for the year on Millakande Estate again shows a moderate increase over the yield in the previous year.

Five fresh cases of brown bast have been reported during the year out of a total of 64 trees at Nivitigalakele. Three cases with localised dry areas have been treated by isolation cuts and maintained in tapping ; the other two cases have been rested. It remains to be seen whether these fresh cases will behave like the earlier ones and recover (with one exception) without developing nodules. The trees on Millakande continue to be free of any defect of this kind.

No further cases of uprooting by wind have been reported from either locality though a re-inspection of the trees shows evidence of loss of branches both on Nivitigalakele and on Millakande. It is considered that the characteristic branching habit of the clone is liable to result in a certain amount of damage of this kind.

Millakande 3/2 is now recommended for large scale planting on areas with rainfall and soil conditions similar to those at Nivitigalakele. Until further information is available its use in the drier districts should be confined to small scale planting.

Millakande 1/1.—Although the yield in 1940 at Nivitigalakele showed a good increase over the previous year, the average increase both there and on Millakande over the past four years has been negligible. On this account, and also in view of its poor growth, the clone can no longer be regarded as of serious interest.

Hillcroft 28.—The high early yield and satisfactory increases shown by this clone may now be considered to have been established. In view, however, of its known susceptibility to brown bast it can only be approved for planting on a small scale until more is known of the incidence of this disease under commercial tapping conditions.

In the 1939 report in this series it was stated that the S/2, d/3, 67% system was not suited to Hillcroft 28. This statement was based solely upon the test tapping records of the original trees on Stennes in 1936 and 1937, and, in view of the highly satisfactory yields given by a 6-acre block of the clone tapped on the same system on an estate in the Kalutara district, it must be withdrawn.

Although spiral fluting at the base of the stem is a common feature of trees of this clone, it rarely interferes seriously with tapping and is not considered to be a serious defect.

Wagga 6278.—The mean yield per tree per annum of the original test tapped trees of this clone increased by 2.2 lbs. to 15.9 lbs. in 1940, in spite of the loss by wind damage of the highest yielding tree of 1939. The remaining 11 trees, first tapped in 1938, gave the same mean yield as the test tapped trees, namely, 15.9 lbs. per tree for the year. These figures show that the clone is now the most outstanding yielder of the Nivitigalakele collection. (It should be remembered that the test tapped trees of WG. 6278 are a random sample of the original buddings whereas those of MK. 3/2 are among the largest in the block).

The first case of brown bast was reported in October, 1940. The affected region was isolated by cuts to the wood and tapping was continued. Yield was hardly affected and at the time of writing

no sign remains of the disease. A second case was reported in March, 1941. This affected the whole cut and the tree has been rested.

As mentioned above, one tree was broken by wind at about 6 feet in May, 1940. This tree had been used for pollination and was supporting a large bamboo scaffold.

At Nivitigalakele, Wagga 6278 has a smooth, well grown trunk which leans somewhat and which branches at 15 to 20 feet from the ground. The trees are tall with medium to light crowns and relatively light foliage. Bark renewal is quite satisfactory both as regards strength and evenness. Latex is normal.

The clone is now approved for planting on a large scale under conditions similar to Nivitigalakele, and on a small scale elsewhere.

TABLE I

YIELD IN GRAMS TAPPING FOR EACH YEAR OF AGE.

Tapping system half-spiral alternate daily (s/2, d/2, 100%)

Clone	Where tapped	No. of trees tapped in 1940	Mean		Mean yield in grams dry rubber per tree per tapping for years :—									Number of tappings	Yield per tree in lbs.
			Age in Years	Grith in inches	1932	1933	1934	1935	1936	1937	1938	1939	1940	In 1940	
Millakande 3/2	Nivitigalakele	10	10	38.4			11	21	30	43	42	60	62	123	16.7
Do	Millakande	10	11	32.2				14	23	28	32	36	39	131	11.1
Millakande 1/1	Nivitigalakele	10	10	28.3					16	26	23	25	34	123	9.1
Do	Millakande	10	11	25.2				15	22	25	28	28	27	131	7.9
Hillcroft 28	Stennes	12	14	45.4	42	47	60	69	65*	57*	73	67	70	137	21.1
Do	Nivitigalakele	8	9½	36.8					16	26	40	43	48	120	12.6
Do	Millakande	10	10	37.5					23	31	41	44	46	131	13.1
Hillcroft 55	Stennes	7	14	45.8		56	63	65*	79*	70*	79**	68*	74**	100	16.3
Do	Millakande	10	10	29.0				10	18	18	24	22	22	131	6.3
Wagga 6278	Nivitigalakele	6	10	33.0					8	29	48	51	60	120	15.9
Millakande 1/3	Do	6	9	32 0					3	11	20	32	34	131	9.7
Diyaberiyakande 1	Do	9	10	28 8					6	14	29	29	34	120	8.9
Dalkeith 5315	Do	6	10	31.8					5	13	22	29	30	120	7.8
Bandarapola 8	Do	9	9½	29,4					8	13	18	24	27	130	7.6
Bandarapola 21	Do	9	9	29.7					6	9	17	23	26	131	7.4
Alpitakande 18775	Do	8	9	27.9					3	9	17	23	25	131	7.1
Dalkeith 1	Do	10	10	32.0					6	13	20	21	26	119	6.9
Madola 18	Do	8	10	31·7					5	12	22	21	26	119	6.9
Seedling Control	Do	10	12	35·4					10	15	24	24	25	120	6.6
Illabuluwa 37	Do	10	10	30.7					7	12	22	28	24	121	6.5
Beau Sejour 3	Do	9	10	32.6					14	16	29	29	21	120	5.5
Dalkeith 3513	Do	6	10	29.2							15	15	23	120	5.9
Coodoogalla 45	Do	21	8½	23.9								14	17	131	4.8
R. R. 8	Do	20	8½	23.3								14	16	131	4.6

* Tapped on S/2, d/3, %67 Tapped on S/2, d/2, 100% March to September on S/2. d/3, 67% for the remainder of the year.

TABLE II

CALCULATED YIELD IN LBS. PER TREE PER YEAR

Clone	Where tapped	No. of trees tapped in 1940	Calculated yield in lbs. per tree for 130 tappings on S/2, d/2, 100% at ages of:—																	
			4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14
Millakande 3/2	Nivitigalakele	10	3.0		6.0		8.7		12.2		11.7		17.0		17.7								
Do	Millakande	10					3.9		6.5		7.9		9.0		10.4		11.9						
Millakande 1/1	Nivitigalakele	10					4.5		7.4		6.4		7.2		9.6								
Do	Millakande	10					4.3		6.3		7.1		8.0		8.1		7.9						
Hillcroft 28	Stennes	12					12.0		13.4		17.4		19.8		15.2		14.0		20·4		19.2		0.0
Do	Nivitigalakele	8				4-5		7.5		12.0		12.3		13.7									
Do	Millakande	10					6.6		8.9		11.6		12.5		13.1								
Hillcroft 55	Stennes	7							16.1		18.1		15.2		19.0		16.8		20.8		16 4		17.8
Do	Millakande	10				2.6	5.1		5.1		6.9		6.2		6.3								
Wagga 6278	Nivitigalakele	6					2.4		8.2		13.7		14.7		17.1								
Millakande 1/3	Do	6					0.7		3.0		5·6		9.2		9.7								
Diyaberiyakande 1	Do	9					1.8		3.9		8.2		8.2		9.7								
Dalkeith 5315	Do	6					1.3		3.8		6.3		8.2		8.4								
Bandarapola 8	Do	9				2.3		3.8		5.2		6.8		7.6									
Bandarapola 21	Do	9			1.7		2.6		4.9		6.5		7.3										
Alpitakande 18775	Do	8			0.9		2.6		4.9		6.6		7.1										
Dalkeith 1	Do	10					1.7		3.8		5.8		6.1		7.6								
Madola 18	Do	8					1.1		3.2		6.4		6.0		7.6								
Seedling Control	Do	10									2.9		4.3		7.0		7.0		7.1				
Illabuluwa 37	Do	10					1.5		3.2		6.3		7.9		7.0								
Beau Sejour 3	Do	9					3.9		4.5		8.4		8.2		6.0								
Dalkeith 3513	Do	6									4.3		4.3		6·4								
Coodoogalla 45	Do	21								4.0		4.7											
R. R. 8	Do	20								4.0		4.6											

TABLE III

COMPARISON OF CEYLON CLONES WITH IMPORTED CLONES

Clone	Where tapped	No. of trees tapped in 1940	Year budded or planted	Mean girth in inches	Calculated yield in lbs. per tree for 130 tappings at ages of:—											
					5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11
Wagga 6278	Nivitigalakele	6	1930	33.0			2.4		8.2		13.7		14.7		17.1		
Hillcroft 28	Do	8	1930	36.8		4.5		7.5		12.0		12.3		13.7			
Diyaberiyakande 1	Do	9	1930	28.0			1.8		3.9		8.2		8.2		9.7		
Millakande 1/3	Do	6	1931	32.0			0.7		3.0		5.6		9.2		9.7		
Millakande 1/1	Do	10	1930	28 3			4.5		7.4		6.4		7.2		9.6		
Prang Besar 25	Do	8	1930	30.2			1.4		3.9		6.1		6.0		7.9		
Prang Besar 23	Do	8	1930	31.2		1.3		2.7		7.8		8.2		7·7			
Coodoogalla 45	Do	21	1932	23.9						4.0		4.7					
R. R. 8	Do	20	1932	23.3						4.0		4.6					
Prang Besar 186	Do	23	1932	23.6						4.3		5.0					
Millakande 3/2	Millakande	10	1929	32.2			3.9		6.5		7.9		9.0		10.4		11.0
Millakande 1/1	Do	10	1929	25.2			4.3		6.3		7.1		8.0		8.1		7.9
Hillcroft 28	Do	10	1930	37.5			6.6		8.9		11.6		12.5		13.1		
Hillcroft 55	Do	10	1930	29.0	2.6		5.1		5.1		6.9		6.2		6.3		
Tjirandji 1	Do	10	1930	34.0	3.3		6.1		5.7*		7.8*		8.2*		7.4*		
Bodjong Datar 2	Do	10	1930	25.5			3.0		4.6		3.6		5.1		4.9		
Bodjong Datar 5	Do	10	1930	26.2			3.3		4.5		4.1		4.5		6.0		
Bodjong Datar 10	Do	10	1930	24.5			3.1		4.7		4.3		4.7		4.3		

* Tapped on S/3, d/2, 67%

TABLE IV

CLONES IN TEST TAPPING AT NIVITIGALAKELE

YIELD IN 1940 CALCULATED ON A BASIS OF 130 TAPPINGS

Tapping System S/2, d/2, 100%

Clone	No. of trees	Age in years	Mean girth in inches 1-1-40	Year of tapping	Mean yield per tree in lbs.
Field 3A—120 tappings					
Wagga 6278	6	10	33.0	5th	17.1
Hillcroft 28	8	9½	36.8	,,	13.7
Diyaberiyakande 1	9	10	28.8	,,	9.7
Delkeith 5315	6	10	31.8	,,	8.4
Prang Besar 25	8	10	30.2	,,	7.9
Prang Besar 23	8	9½	31.2	,,	7.7
Dalkeith 1	10	10	32.0	,,	7.6
Madola 18	8	10	31·7	,,	7.6
Seedling Control	10	12	35.4	,,	7.1
Illabuluwa 37	10	10	30.7	,,	7.0
Heneratgoda 24	9	10	27.7	,,	6.7
St. George 40	10	10	31.7	,,	6.3
Beau Sejour 3	9	10	32·6	,,	6.0
Kiriella 11	6	10	33.8	,,	4.6
Dalkeith 3513	6	10	29·2	3rd	6.4
Madola 22	10	10	28.3	,,	5.6
Hunasgiriya 1391	10	9½	23.5	,,	4.7
Warriapolla 76	13	9	28.1	,,	4.1
Nakiadeniya 1	10	9	27.4	,,	3.9
Markville 1	10	8½	29.2	,,	3.7
Elston 2239/12	9	9	25.7	,,	3.6
Nakiadeniya 4	10	9½	26.7	,,	2.9
Warriapolla 57	6	10	25.7	,,	2·4
Warriapolla 24	10	10	25.4	,,	1.
Pilmoor A. 44	10	10	22.8	2nd	5.0
Warriapolla 25	9	9	23.3	,,	2.3
Field 3C—123 tappings					
Millakande 3/2	10	10	38.4	7th	17.7
Millakande 1/1	10	10	28.3	5th	9.6

TABLE IV—(*Contd*)

Clone	No. of trees	Age in years	Mean girth in inches 1-1-40	Year of tapping	Mean yield per tree in lbs.
Field 4 A—131 tappings					
Prang Besar 186	23	8½	23.6	2nd	5.0
Seedling Control	24	12	33.5	,,	4.7
Coodoogalla 45	21	8½	23.9	,,	4.7
R. R. 8 (Marcot 52)	20	8½	23.3	,,	4.6
Culloden 2	22	9	22.9	,,	3.9
St. George 60	26	8	24.0	,,	3.6
Kepitigalla 3	25	8½	23.0	,,	3.0
Ambatenne 1	20	8½	23.2	,,	2.9
Gikiyanakande 1	24	8	23.7	,,	2.9
Ambatenne 2	24	8½	23.7	,,	2.7
Hapugastenne 33	23	9	22.9	,,	2.7
Shaliacary 23	20	8	20.4	,,	2.6
Gikiyanakande 4	22	8	23.2	,,	2.4
Millakande 1/2	27	9	22.2	,,	2.3
St. George 2843	21	8	21.7	,,	2.1
Warriapolla 22	14	8½	19.0	,,	2,1
Gikiyanakande 2	20	8	21.2	,,	2.0
Clara 4	13	8	19.4	,,	1.7
Alpitakande 18910	18	8½	20.7	,,	1.6
Kepitigalla 7	9	9	19.3	,,	1.0
Fields 4B and 4C—131 tappings					
Millakande 1/3	6	9	32.0	5th	7 9.
Bandarapola 8	9	9½	29.4	,,	7.6
Bandarapola 21	9	9	29.7	,,	7.3
Alpitakande 18775	8	9	27.9	,,	7,1
Eriagastenne 1	10	9	29.0	,,	4.1
Talgaskande 1/5	10	9	26.4	3rd	6.0
Humbaswalana 7/1	9	9	29.3	,,	4·6
Millakande 13/2	10	8	27.1	,,	4.3
Tempo 6	10	9	28.1	,,	4.3
Alpitakande 843	10	9	24.6	,,	3·7
Eriagastenne 2	10	9	25.8	,,	3.0
Guava Hill 47	10	9	25.6	,,	2.7
Guava Hill 50	10	9	25.6	,,	2.1
Bandarapola 1	10	9	21.8	2nd	4.4
Troy 6/11	10	9	22.0	,,	3.1

TABLE V

CLONES IN SEMI-COMMERCIAL TAPPING AT NIVITIGALAKELE YIELDS IN 1940-41 CALCULATED ON A BASIS OF 65 TAPPINGS

Tapping System 2S/2, d/4, 100%

Clone	Number of trees tapped	Age in years	Yield per tree in lbs.
Mirishenaa 11 ...	41	10-11½	8.7
Lavant 28 —	76	11-13	8.3
Govinna 1836 ...	86	11-13	7.7**
Beau Sejour 5 ...	23	10-11½	7.4
Cuilcagh 4 ...	105	11-13	7.4**
Eladuwa 1 ...	156	10-11½	7.4
Millakande 10/2 ...	87	10-11½	7.0
St. George 45 ...	112	11-13	6.9
1926 Seedling Control ...	22	14	6.9
Cuilcagh 5 ...	95	11-13	6.9**
Mirishena 2 ...	35	10-11½	6.7
Heneratgoda 2 ...	95	11-13	6.6**
Glendon A.4 ...	84	10-11½	6.6
Palmgarden 3183 ...	30	10-11½	6.6
Govinna 771* ...	81	11-13	6.5**
Millakande 1/1 ...	28	10	6.3
Cuilcagh 3 ...	72	11-13	5.9
Kobowella 41 ...	77	10-11½	5.9
Palmgarden 4849 ...	87	10-11½	5.6
Kobowella 42 ...	95	10-11½	5.4
Yogama 21Y ...	122	10-11½	5.3
Madola 110 ...	48	10-11½	5.1
Mirishena 3 ...	113	10-11½	5.1
Eladuwa 4 ...	100	10-11½	5.1
Eladuwa 5 ...	89	11-13	4.6
Lochnagar 1/15 ...	81	11-13	4.6**
Yogama 8Y ...	51	10-11½	4.3
Frocester 56 ...	75	10-11½	4.1
Talagalla 2 ...	69	10-11½	4.1
Eladuwa 3 ...	77	10-11½	3.9
Kosgalla 6 ...	55	10	3.9
Yogama 1H ...	85	10-11½	3.7
Madola 15 ...	29	10	3.6

* Tapped 2S/3, d/4, 67% on account of heavy incidence of brown bast

** Yields of a few trees test-tapped on S/2, d/2, 100% included

RUBBER BRANCH PRUNING*

J. D. FARQUHARSON, *Vogan Estate*

A heavy crown, or dense foliage, is a marked characteristic of several of the high yielding clones selected for replanting in Ceylon. Owing to the seasonal wind and rain storms, and to the exposed hilly areas of the majority of clearings, it has been found advisable to branch prune these clones, and so a few notes and photographs may be found of some use.

The general policy today, is to plant a far greater number of trees than will be required for the final stand per acre. This naturally permits of a carefully thinning out of poor trees, by selection and test tapping, but at the same time has the tendency to cramp the crown of the tree from an early stage. Without a system of judicious branch pruning from the first year of planting, it will be found that the cramped branches will endeavour to find spreading space by growing up steeple, or spire fashion, (Plate 1) instead of with a natural outward growth. This steeple effect will have the unpleasant characteristic of diverting most of the rain water on its branches and foliage, down the trunk and over the tapping panel, and so of keeping the bark wet for a far longer period than otherwise. Wet bark, being a serious factor in commercial tapping, will also adversely affect test tapping, making it more difficult when thinning out.

On loose soil in low-lying land the weight of the crown may prove too great, and cause severe leaning, and liability to wind damage, so that branch pruning is very necessary to help prevent this. No definite policy for pruning can be followed, and every clone and tree should be treated on its individual merits. Several clones can be classified as having heavy crowns, but others such

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PLATE 1

PLATE 2

PLATE 3

PLATE 4

as T.J. 16, and Pilmoor B.84, would come under this category only if growing in certain soils. Treatment for heavy crowns should only be necessary up to the fourth year, after which the root system should have developed sufficiently to carry the overhead weight unless in *deniya* land. There is also a greater liability to seriously wound the tree, if pruned late, and so set the train for later trouble in disease.

As mentioned above different environmental conditions are factors to be considered, and very few clones can be classified definitely as possessing heavy or light crowns. Two well known exceptions for Ceylon being T.J. 1, as heavy and Glenshiel 1, as light. A few of the Prang Besar clones may be considered heavy, though the majority are medium, but reveal a measure of variability of behaviour under different conditions of soil and site. Prang Besar 186 for instance has been found reasonable in Malaya, but a bad breaker in Sumatra, while P.B. 25, so popular in Ceylon is less subject to environmental influence than most others. It will thus be seen, that when selecting clones for planting in Ceylon, the above factors must be considered carefully, especially in relation to possible wind damage to the new clones now being advocated, such as M.K. 3/2, WG. 6278, P.R. 107 and the many new Avros selections.

To return to the question of branch pruning or thinning out of branches, this can be divided into three sections or types. (One) the thinning out of branches in a too heavy crown ; (two) the complete pollarding of certain clones ; and (three) the pollarding of individual trees, especially in relation to clonal seed clearings. The best example of a clone requiring branch thinning out, is the well known T.J. 1, and that for pollarding is B.D. 5, though there is still a school of thought against any form of pollarding, in that it is contrary to nature. The very first stage in branch pruning is the removal of all side shoots from the plant up to the height of 5 or 6 feet during the first year, and this has been generally accepted by all planters for all clones. A characteristic of T.J. 1, is, what can be considered a well formed primary branch appearing at about 5 to 7 feet high in the first 12 months (Plate 2) and this should be removed as early as possible (Plate 3). The pruning knife shown in this plate is obtainable in Colombo, of varying lengths of shaft, and will be found most useful for the first three years. One round of careful selective branch thinning out will

then be necessary for each year for the next three to four years, careful attention being paid to the application of a suitable fungicide to the cuts not later than the day following the pruning. Plate 4 shows the result of pruning in the fourth year. Special attention must be paid to leaving spreading branches, and so help the tree not to encourage the growth of too many upward growing branches, that is a forming of the fastigiate type of crown, (Plate 1). In Java, the policy is to branch prune T.J. 1, very heavily indeed, and it remains to be seen whether a very heavy prune will be necessary or not in Ceylon.

The second type of crown control is the pollard, and in this article applies to B.D. 5 clone. This clone has the pronounced tendency of delayed branching, and in many instances has not branched before its 3rd year, and so, if planted on a hillside, is liable to severe wind damage when the crown does begin to form. The advice to pollard comes from its home country, and it is left for Ceylon to decide whether a slight loss in girth through pollarding is worth the possibility of a likely blow down before or after commencing tapping.

A typical example of pollarding of this clone, is shown in Plates 5 and 6 where 75 per cent of a 50-acre field required pollarding. A 20-acre field of T.J. 1, (unpollarded) of the same age, has shown a girth increase of only 1 inch over the pollarded B.D.5, and the T.J.1, not only being a quicker grower than B.D.5, under equal conditions, is in this case growing in most ideal flat land. A suitable time of the year, *i.e.* not before the dry season, must be chosen for this work and the trunk or main stem cut across at 10 to 12 feet between two bud node patches. An application of fungicide is then applied. Plate 6 shows the pollarded tree rebranching, 3 to 4 months later, with all but four branches (each facing different directions) having been removed. It is very necessary when selecting your four branches to have them well "staggered." Plate 5 shows the growth two years after pollarding. and on several plants the "stagger," (having been insufficient) has been almost entirely lost. This union at the pollarding point in the cases shown in Plate 5 may probably constitute the weakest part of the tree in later years.

The question will arise, when to pollard, and the nearest answer that can be given, is when the stem at the height to be pollarded, say 10 feet, has turned brown and provided no branches

PLATE 5

PLATE 6

PLATE 7

PLATE 8

have yet been formed. In most areas about 2 years after planting, though further rounds will have to be made later, to include the slow growers. The idea of pollarding is to assist the tree to form a respectable crown at a reasonable height, and once the new branches have developed it should not be necessary in later years, to have to do any branch thinning out.

The third type applies entirely to "clonal" seed clearings, and Ceylon knowledge and experience with clonal seed is still very much in its infancy. The delay in this is due almost solely to the lack of sufficient guarantee of the validity of the material. Work on pollination and "crossing" is continuing, and though guarantees are available as regards crossing they do not cover results. In other words seeds obtained as true, may not develop 100 per cent true to type, and this has been shown very clearly already in areas planted up in Ceylon as far back as 1938. These clearings are showing an enormous variety of types of branching, (Plate 7) which, though not by any means condemning the "breed," probably indicate a variety of yielders. Areas which are already in tapping will probably have shown this more clearly than by conclusions from pin pricking.

However the problem being dealt with here is that of pollarding the late-branching individuals, and the system is exactly the same as that given in the preceding paragraphs for B.D.5. It is given however, with a certain amount of reserve, in that, owing to the dense initial planting adopted for clonal seed, it may prove of greater benefit to thin out, that is remove entirely, those plants which have not branched correctly after two years. Here again, for lack of information, a very high yielder may be sacrificed unnecessarily, and so a pollard can at least save the plant until test tapping has condemned it or otherwise. The response to pollarding of seedlings is naturally better than that of grafts, and Plate 8 shows the three stages. On the extreme left is a typical example of delayed branching; in the centre, two plants, three months after pollarding, and on the extreme right is a good example of a plant 18 months after pollarding. There is some difference of opinion in regard to height at which to pollard seedlings, eight feet or twelve, and it would be safe to suggest the lower height for hillside and exposed areas, and twelve feet for flat land.

The question of cost has not been touched upon, as this would vary greatly. For branch thinning out of a clone such as T.J.1,

which can be considered the most expensive, the cost should not exceed Rs. 2 to Rs. 3 an acre for each year and this includes the application of a fungicide.

Very little more can be added to an article of this nature except a warning that the question of crown treatment of high yielding clones should not be entirely ignored. Many clones are in tapping at the Research Station, and on estates, and planters, interested in the future of their clearings, should make a special effort to visit those areas where their particular clone may be at least six years in growth. It does not follow that imported clones will behave in Ceylon exactly as they behaved in their mother countries, nor behave the same throughout Ceylon.

This article is, therefore, not one of any hard and fast rules and advice, but an attempt to draw the planter's attention to the possibility of averting wind damage, etc. where possible.

BUDDED RUBBER IN COMMERCIAL TAPPING*

DIAS, PEIRIS & CO.

Records of yield and other data are presented from commercially tapped replanted blocks of Budded Rubber, on Wawulugala and Milleniya estates.

Results of test-tapping of clones in a commercial tapping, are also published.

General and informative comments are offered.

1. 5-Acre Block, Wawulugala

THIS small block, 5 acres in extent, confined to the lower reaches of a big hill, was replanted on contour platforms in June, 1932, budded stumps of imported and own clones forming a mixed polyclone, with a high initial density of 165 plants per acre. Casualties, more than normal, were successfully replaced in November of the same year. For the first 6 years a thick cover of Pueraria flourished, only to disappear in 1939, presumed to be due to "soil sickness." Till now, all efforts to re-grow the cover failed.

A review of the results of experimental tapping in this area for the year ended 31st October, 1939, was made in a contribution published in the *Times of Ceylon* on 31st January, 1940, wherein the precoagulating tendency of latex from trees of clone Glenshiel 1 was recorded for the first time in Ceylon, and a computation of commercial yield of 678 lbs. per acre per annum was made.

Commercial tapping commenced on 1st November, 1939, preceded by a thinning down of the stand from 165 to 141 trees per acre. Table I presents the yields for the calendar year 1940 Tapping cuts, at the beginning and end of the year, stood respectively at a height of 14 and 5 inches above the union. Bark consumption averaged about 9 inches per year. Tapped trees constituted 99 per cent of the stand. The tapping system adopted

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was a third spiral on trees of clone Glenshiel 1 and a half spiral on trees belonging to other clones (Tj. 1, Tj. 16, BD. 5, W. 259, 320, M. 191, etc.), tapped every other day.

TABLE I

Month	Days Tapped	Latex (lbs.)	Scrap (lbs.)
January ...	16	454	13
February ...	5	118	4
March ...	10	197	14
April ...	15	421	17
May ...	9	220	11
June ...	11	236	12
July ...	15	339	14
August ...	15	382	17
September ...	13	361	14
October ...	11	283	14
November ...	11	275	13
December ...	14	361	16
	145	3,707	159

The annual rainfall amounted to 118.77 inches on 202 wet days. For purposes of tapping, the area was divided into 3 tapping blocks of an average of 234 trees per block. All the three blocks were tapped one day and rested the other, latex on tapped days being separately coagulated, milled and creped. No Metrolac reading was recorded and tappers, non-resident Sinhalese, were paid the Standard Minimum Wage throughout the year. Tapping was suspended for one month for wintering. Scrap, for which the tappers were paid an extra of half-a-cent per pound, formed 4 per cent of the total crop for the year. Labour out-turn was almost 100 per cent, only two tappers out of a possible 435 for the year being absent. The intake per tapper of latex only, over the whole year, averaged 8.56 lbs. Yield per tree per annum, without deleting the trees

rested for Brown Bast or for other reasons, stood at 5.51 lbs. For 1940, this area was assessed on the basis of girth, at 659 lbs. per acre. Actual crop harvested works out at 773 lbs. per acre. It must be remembered that trees of clone Glenshiel 1, forming about 40 per cent of the tapped stand, were tapped on a third spiral every other day and not on the standard tapping system.

The number of trees rested for Brown Bast rose from 23 in June to 122 in December. A fuller account of Brown Bast is given in a later paragraph of this memorandum.

2. Field 3, Wawulugala

This area, comprising a low undulating hill and its environs, originally reckoned as 20 acres but now the planted area demarked by survey as 18 acres, was replanted Polyclone in June, 1933, using budded stumps of a number of imported and local clones, on the contour platforms. Soil varies from sandy loam to laterite, and subsoil from pockets of fair depth and texture to patches of "cabook."

A well thought-out regular Polyclone, with a tree each from the better known Tj. 1 and Gl. 1 occurring in every group of 4 trees, the other two coming from imported and local "dark horses" as Rubana 393, T.K. 26, W. 120, 259, 320 and H.C. 28 and forming well defined zones — a system which not only implies but facilitates the progressive elimination of the misfits with minimum of loss to the stand and its yield — is a tribute to the genius of the late Mr. C. E. A. Dias. A few trees of Tj. 16 and B.D. 5 entered the clearing by the backdoor as welcome "rogues." Stray trees of PB 24, 25 and 86 came in as "supplies."

Commercial tapping was initiated on 1st November, 1939, after a preliminary test-tapping covering 6 months. A mild thinning, carried out on the basis of girth, brought down the stand from the original 151 to 129 trees per acre. On the 1st January, 1940, 99 per cent of the total stand of 2,325 trees, was in tapping, with the tapping cuts at a height of 20 inches above the union. By the close of 1940, the height was lowered to 14 inches from the union, consuming 6 inches of bark in the year, on a half spiral once in three days. Trees with a minimum girth of 18 inches were taken into tapping.

The area was divided into 12 tapping blocks with about 190 trees to a block, four sections being tapped every day. Crop from

this area was coagulated and creped separately. The area was rested for wintering from 11th February to 12th March, 1940. Non-resident Sinhalese labourers were employed to tap this field and they were paid the Standard Minimum Wage. Actual attendance of labour in the year, stood at 99 per cent of the possible.

Yields and other data are given in Table II.

TABLE II

Month	Days Tapping	Yield in pounds	
		Latex	Scrap
January, 1940 ...	31	1,040	50
February ...	10	235	13
March ...	15	185	22
April ...	28	753	61
May ...	21	430	39
June ...	23	625	41
July ...	30	948	51
August ...	29	910	52
September ...	27	895	30
October ...	25	833	80
November ...	25	886	47
December ...	29	1,061	55
	293	8,801	541

Intake per tapper of latex alone for the whole year, averaged 7.56 lbs. The percentage of scrap to the total crop amounted to 5.8. On the basis of girth, the clearing was assessed at 650 lbs. per acre. The yield harvested on S 2, d 3, 67 per cent worked out at 519 lbs. per acre. If allowance is made for the mildness of the tapping system, the clearing would probably be deemed to have justified the assessment.

Trees rested for Brown Bast varied from 1½ to 2 per cent of the tapped stand. Details of Brown Bast are summed up in para 5.

3. Udugalla, Milleniya

This area embraces a low granite hill and extends over into a flat deniya. A slice of about ten acres was planted in 1932 at 123 per acre. The balance part of 13a. 2r. 5p. was replanted in 1933 at a density of 198 plants per acre. Deniya ranges over 7 acres of the latter, and is rendered conspicuous by a number of parallel drains, drain-edge planting and yellow foliage. Though replanted in two different years at two different densities and on two different soil types, the clearing is treated as a single unit, similar in design and other matters to field 3 of Wawulugala. The whole clearing was tapped on one day and rested for two days, 12 sections of 215 trees each in the first half of the year 1940, and 13 sections of 218 trees each in the second half. The tapped stand formed 88 and 97 per cent of the total in the first and second half of 1940. Labour engaged was from local villages and the out-turn amounted to 96 per cent of the possible. On 1st January, 1940, the field carried 2,931 trees, about 124 trees per acre. Tapping system, heights of cuts, preliminary test-tapping, bark consumption, payment of wages, collection and coagulation, recording of yields, etc. were on the same basis as those of field 3 of Wawulugala. Table III gives details of yields.

TABLE III

Month	Days tapped	Latex	Scrap
January ..	10	1,081	74
February ...	—	—	—
March ...	11	828	85
April ...	9	757	84
May ...	8	741	80
June ...	9	923	72
July ...	10	1,481	110
August ...	9	1,461	104
September ...	9	1,224	98
October ...	9	1,109	72
November ...	8	1,217	105
December ...	10	1,573	100
	102	12,395	984

No record was kept of cases of Brown Bast though it was attended to on the spot. The intake per tapper averaged 10.12 lbs. Scrap formed about 7.3 per cent of the total crop. About a thousand trees were thinned out during the period of test-tapping in 1939. The clearing was awarded a total assessment of 12,297 lbs. for 1940 but the harvested yields on S/2, d/3, 67 per cent amounted to 13,379 lbs. In other words, the field was assessed at 523 lbs. per acre on the basis of girth but the harvested crop on a milder system averaged 569 lbs. per acre.

The reasons for poorer assessment by girth must be sought in the depressed growth on the Deniya part. The high initial density of 198 trees per acre in the 13½ acres (including the Deniya) must also have contributed to the poorer girthing.

A special feature of interest in this clearing lies in the repeated applications of dung buried in shifting shallow trenches. The Superintendent has a reputation of his own in this respect and results have justified his optimism, more than once.

4. Test-tapping of Clones in Field 3, Wawulugala

Running as this experiment does, through a commercially tapped Polyclonal block, it offers a reliable testing ground for comparing the performance of the partaking clones under conditions of strict similarity. Altogether, 7 clones are involved ; Tj. 1, Gl. 1 and HC. 28, 40 trees per clone, occur together in one tapping block : Clones W. 259 and 120, 20 trees each, in another : and W. 320 and Rub. 393, 20 trees per clone, in a third section.

The selected trees are tapped by commercial tappers in the course of their normal commercial tapping of the area. The trees are not selected at random. In four instances, there were no more than 20 trees of the required clones. In the case of other clones, the first forty, counted from one end, were taken. Even here, the test-tapped trees formed more than 90 per cent of the clonal stand.

The tappers are paid standard daily wages and proper control is exercised over collection and weighing. Collection of latex from the test tapped clones is made in buckets bearing distinctive paint bands corresponding to those on the trees. On the first normal tapping day in each fortnight, wet weights of the clonal collections are recorded and dry weights determined by actual trial

coagulations. On all other tapping days, only the wet weights are registered and dry weights calculated by using the relationship obtained in the then recent trial coagulation. Washouts are omitted from records.

No new trees are taken in the place of those rested for Brown Bast. The full strength of the trees is maintained in all calculations. Cuts are opened at 25 inches from the union and tapping continued on a half spiral tapped third daily, consuming 6 inches of bark per annum, in harmony with the commercially tapped trees. It is proposed to continue the experiment for as long a period as possible.

TABLE IV

Month	Yield per tree per tapping in grams from Clones						
	TJ [1]	GL 1	HC 28	W 320	R 393	W 120	W 259
July, 39	30·72	19 47	23.21	17.91	7.27	12.98	24.93
August ...	32.84	26.28	23.33	21.95	13.27	8.72	21.75
September ...	18.77	21.36	22.95	11.59	5·27	12.31	13.50
October ...	39.80	23.95	25.37	20.71	11.28	11.40	20.83
November ...	45.67	29·31	21·63	23.69	13.60	19.58	14.65
December, 39 ...	38.76	28.16	24·94	22.86	18.06	24.79	21.42
	34·79	25.01	23.75	20.54	12.41	15·61	20.08
January, 40	29·99	25.05	26·54	25.54	18.56	19.93	23 13
February ...	26·51	14·92	29.16	19.88	5.68	15.37	21.21
March ...	11;08	15·05	13·97	7.78	4.94	8.46	6.30
April ...	23·00	31.13	28·71	4.43	5.98	9.88	20.68
May ...	17·58	19·17	21.04	11.19	6.36	8·52	19·82
June ...	26.13	22.95	23.20	15.16	7.38	18 18	19.99
July ...	25.33	21·43	22.40	15.48	6.69	14 35	19.92
August ...	22·29	24.06	28.21	22 18	11.47	19 82	24·59
September ...	21·79	25.36	28.53	16.13	9.36	17·01	21.49
October ...	19.80	19·60	26.71	11.91	8.50	14 20	15.15
November ...	35 81	22.72	28 85	14.88	16.40	13.43	13.63
December, 40 ...	33.46	19 73	26.35	18.52	11.96	18.93	24.74
	25·24	22·73	25.90	15.72	10.20	15.65	20 23

Girths are measured once a year, at 3 feet from ground. Virgin bark and one year renewal are measured. Periodical observations are made of the various facts and features presenting themselves. Scrap is not included in the above figures. From June to December, 1940, one tree of Rub. 393 was rested for Brown Bast. In December, 1940, 3 trees had to be rested for Brown Bast in Gl. 1, and one tree in HC. 28. A careful scrutiny of Table IV may show some interesting features. Clones W. 120 and 259 maintained their yields without a fall. The behaviour of Rub. 393 is disgusting. W. 320 has probably regressed. A comparison may be made between the monthly yields from July to December of 1939 and 1940, to find that Tj. 1 has shown a progressive decline in 1940. Probably it may stage a come-back in 1941. Gl. 1 made some ups and downs, more of the latter than of the former. HC. 28. on the other hand, has been recording steady increases.

No wind damage was reported from the area. Bark readings are summarised in Table V below :—

TABLE V

Clone	Trees Measured	Bark thickness in mm.		% Renewal
		Virgin	1 year renewal	
Tj 1	40	7.65	6.80	89
Gl 1	40	7.30	6.30	86
HC 28	40	7.28	6.70	92
W 320	20	7.35	6.65	91
R 393	20	6.95	6.75	97
W 120	20	8.00	6.95	87
W 259	20	7.65	8.10	106

Virgin bark of W. 320 is very hard. Renewal on all clones is satisfactory. The renewing bark on HC. 28 and Rub. 393 appears to be knobby, though not on a disquieting scale. Renewal on W. 259 is bulky and massive.

Girth increases are analysed in Table VI below :—

TABLE VI

Clone	Trees	Average increase in girth during 1940 inches	Average annual increase over 6½ years	% of Col. 3 to Col. 4
Tj i	40	2.42	3.64	67
Gl 1	40	1.80	3.17	57
HC 28	40	2.73	3.96	69
W 320	20	1.65	3.04	54
R 393	20	2.00	3.42	58
W 120	20	2.45	3.55	69
W 259	20	2.45	3.32	74

All clones are slackening in girth rate which is understandable. W. 320 is probably heading for stagnation. W. 259, a medium girther, is showing a high ratio between the increase in 1940 and the annual increase over 6½ years.

5. Brown Bast at a Glance from the 5-Acre Block and Field 3.

Name	5 acre Block		Field 3	
Trees tapped	702		2295	
System	(S/2, D/2, 100% & S/3, D/2, 67%)		S/2, D/3, 67%	
Month	Rested for B. Bast	% Rested to tapped stand	Rested for B. Bast	% Rested to tapped stand
Jan./May	—	—	—	—
June	23	3.3	46	2
July	40	5.7	48	2
August	45	6.4	35	
September	63	9.0	32	1½
October	77	11.0	35	1½
November	87	12.4	43	2
December	122	17.4	47	2

Table VI, given above speaks for itself. Trees rested for Brown Bast in the 5-acre Block, rose from 3.3 in June to 17.4 per cent of the tapped stand in December, 1940. In Field 3 however, the percentage of incidence remained almost stationary, at 1½ to 2 per cent of the tapped stand. The two fields are not comparable, for the following reasons :—

(a) 5-acre block is older than field 3 by one year and tapped for a longer period.

(b) The former is tapped on S/2, d/2, 100% (except on Gl. 1) and the latter on S/2, d/3, 67%.

(c) The stand is denser in 5 acres than in field 3.

(d) The tapping cuts are nearer the union in 5 acres than in field 3.

(e) During tapping, a greater depth is reached in 5 acres as compared to that of field 3.

Brown Bast and Budded Rubber go well together and incidence of the disease is directly proportional to the yield rates. Shallow tapping reduces the attacks but also results in a shrinkage of crop. The policy underlying tapping these fields has been to tap as deep as possible, consistent with safety and tackle Brown Bast as and when it presents itself.

The sequence of steps taken may be described here in a nutshell. High yielding trees, trees with hardly any scrap on the cut and late dripping trees were noted. Most of the attacks occurred on the above categories. At the first sign of even a partial drying of the cut or the complete cessation of yield without a dry patch, tapping was suspended. The Kangani was charged with the duty of this detection, resting and noting down the numbers of trees rested month by month. The numbers were plotted by clones on a chart and the progress studied. After a compulsory period of rest for three months, attempts were made to reopen the cuts. Little success attended these trials. A system of "sounding" the bark with a specially made driving knife was evolved. "Soundings" were made a couple of inches below the rested cut at three different places on the same plane. In judging the recovery or otherwise, three criteria were followed, viz. the time-lag between the removal of the driving knife and the appearance of latex, the speed of flow after appearance of latex and the consistency

of latex. If response proved to be satisfactory, a very shallow cut is drawn parallel to the tapping cut at about the height of successful sounding, with a Jebong knife, inserted deep in the shallow channel and pulled the whole length. The new tapping cut was opened half an inch below this isolation channel. The soundings made by the driving knife of Milleniya pattern, had not disfigured the panels in any way. The operation was easily mastered and carried out with remarkable success by all the tapping Kanganies. By the end of 1940, the system took a practical shape but was not employed on a commercial scale till January, 1941. In the 5-acre block where the cuts were within 6 inches from union, it was not considered practicable to adopt this system until after the change-over, scheduled to take place after wintering.

Table VII, given overleaf, presents the figures in clear light.

Table VII is self-explanatory. Brown Bast caused 16 per cent of the stand in 5 acres to be rested. A study of the monthly chart has led to the impression that local clones suffered more than the imported (in respect of days rested for Brown Bast). Trees of Gl. 1 show a marked susceptibility to Brown Bast as the cuts approach the union. Clone Tj. 16 showed the least incidence and the best recovery. Treatment applied was only of a limited character, and the response of percentage recoveries is considered high.

In Field 3, only 3 per cent of the stand had to be rested. This was probably caused by a shorter duration of tapping, mildness of the tapping system and the greater distance between the cuts and the union. The percentage of recoveries in general and in the local clones in particular, seems to be rather enervating. Only 2 per cent of the trees in HC. 28 were attacked, and none recovered. The same low incidence was also seen in Gl. 1, but 14 per cent of the attacked trees staged a recovery. W. 259 and Tj. 1 were subject to fairly heavy attacks, but recoveries amounted to more than half the attacks.

6. Informative Comments on the Behaviour of Clones

Tjirandji 1.—No wind damage of any importance was reported. One or two estates in Ceylon experienced with Tj. 1, a strong tendency to precoagulation of latex on the cuts and in the collecting pails. This was probably occasioned by shallow tapping, conservative bark consumption, inadequate slope of the tapping cut.

TABLE VII

Clone	5 ACRES						FIELD 3					
	1	2	3	4	5	6	1	2	3	4	5	6
	Trees Tapped	B. B. Cases	% Incidence to stand	Attacks in 1st 9 months	Recoveries	% Recoveries to Attacks in Col. 4	Trees Tapped	B. B. Cases	% Incidence to stand	Attacks in 1st 9 months	Recoveries	% Recoveries to attacks in Col. 4
Tj. 1	171	31	18	**23**	5	**22**	613	35	6	**28**	16	**57**
Gl. 1	278	75	27	**36**	11	**31**	582	10	2	**7**	1	**14**
Tj. 16	39	3	8	**3**	3	**100**	7	—	—	—	—	—
B. D. 5	47	6	13	**4**	0	**0**	31	—	—	—	—	—
Rub. 393	—	—	—	—	—	—	93	3	3	**2**	1	**50**
Waw. 118	3	1	33	**1**	1	**100**	—	—	—	—	—	—
Waw. 259	15	5	33	**3**	1	**33**	138	14	10	**13**	7	**54**
Waw. 320	104	18	17	**10**	3	**18**	152	5	3	**5**	4	**80**
Mill. 191	36	7	19	**3**	0	**0**	—	—	—	—	—	—
H. C. 28	—	—	—	—	—	—	469	7	2	**4**	0	**0**
Others	9	—	—	—	—	—	210	—	—	—	—	—
	702	146	16	**83**	24	**29**	2,295	74	3	**59**	29	**49**

double cut system of tapping on all days and allied factors. In Udugalla, 5-acre block or field 3, no such tendency was exhibited by Tj. 1. The slow drying of the tapping cuts on wet days, to counteract which cloth-rubbing was resorted to on some estates in Ceylon, was not understood in our Polyclonal areas where the panels on all clones dried earlier and dried at the same time. Late-drip was noticed on a small scale. A strong tendency to flare-ups and collapses in yields was noted and no relationship was found between drought and depressed yields or wet weather and enhanced yields. Most of the trees in Tj. 1 displayed an out of the ordinary variation in yield from day to day. On Deniya, the trees registered very poor yields.

Glenshiel 1.—Precoagulation of latex persisted on a much reduced scale. Scaly bark was noticed on trees in Udugalla but not in field 3. The association of a narrow headed clone like Gl. 1 with the heavy crowned Tj. 1 or HC. 28 resulted in a set-back in growth of the former. But, key to the rapid drying of panels may have to be found in this association. As the cuts approached the union, the incidence of Brown Bast increased at an unduly faster rate than on other clones. If this defect is confirmed from other sources, change-over of panel must be made when the tapping cuts are within 8 inches from union.

Tjirandji 16.—A virtual stagnation has set in, yields neither increasing nor decreasing.

Hillcroft 28.—As growth advances, the grooves caused by spiral fluting on the panel region, seem to be getting deeper. Yields are progressively increasing. Trees attacked by Brown Bast have not recovered. Renewing bark is more knobby in Udugalla than in field 3. Late drip is more pronounced on this clone than on Tj. 1. After the day's yield has been collected, bubbles of latex congregate on the cut : these split even under a slight shower and the latex flows out as if the trees were tapped.

Wawulugala 320.—Virgin bark is very hard and the crown sickly. The clone seems to be a poor girther. Occasional trees are high yielding but 75 per cent of the trees deserve to be rejected. Most of the trees of Waw. 320 went stark dry for ten days in field 3, during a period of low drought. A milder system of tapping is indicated for use on this clone.

Rubana 393.—Yields are despairingly low and no response resulted from increases in intensity or frequency or both. The trees carry magnificent heads and growth is good. Bark renewal being knobby, leaves much to be desired. It is proposed to eliminate the trees from the above areas.

T.K. 26 and AV. 256.—Both show precoagulation on the tapping panels. The less said of the yields, the better it is.

Wawulugala 259.—Growth is slow but sustained over a longer period. Foliage makes quick friends with Oidium. Yields are of the same grade as Gl. 1, the former maintains and the latter tends to decline. Bark renewal is excellent. The incidence of Brown Bast is high but recoveries good on a milder system. Bark is slightly corky, a helpful factor in tapping. The clone seems to be more suited to laterite and granite hills rather than soft soils and flat lands.

A.D. 24.—There are about ten trees of this clone in tapping on Udugalla, scattered over the whole area. Their performance must be termed as excellent. Virgin bark is of fair thickness. Trunk is without any flaw. Crown is neither heavy nor slender. In yield, there is little variation, from tree to tree, season to season and day to day. In 1940, yields averaged about 12 lbs. per tree. Arrangements are being made to include this clone in the present replantings.

Other Clones.—A few trees of Clones PB. 24, 25 and 86 are in tapping, both in field 3 and in Undugalla. PB. 86 is faring well and 24 is poor. PB. 25 is doing well in field 3 and ill in Udugalla.

7. Comments on Methods

The standard of tappability was fixed at a girth of 18 inches at 3 feet from ground. Tapping cuts were opened at 25 inches from union. New trees were taken into tapping as soon as the requisite girth was reached but the cuts on new trees were opened at heights corresponding to the then existing tapping height in the clearing at the time. This was intended to facilitate change-over.

Tapping was carried to a greater depth than usual but not too deep for safety. This enabled the harvesting of maximum yields. As was expected, Brown Bast rose its head but as was explained under the relevant sub-heading, it was controlled.

Bark consumption in these clearings went at a pace which may not find much support, but consumption on the scale that was done matters little with budgrafts. The excellent renewal justified the means adopted.

Fears expressed in some circles in Malaya about wounding on young budded trees during tapping appear to be groundless in Ceylon where the tapping tasks are smaller, tappers are well trained and control is easier on account of the smaller size of fields.

The harvested yields in Udugalla and 5-acre block greatly exceeded the assessed yields. It is regrettable that enhancements of this kind are not entertained in Ceylon till the clearing completes 12 years of life. It amounts to penalising budded Rubber for better performance than was stipulated in an arbitrary scale. It is not suggested that the scale adopted be revised but what is requested is a provision to revise assessments in harmony with harvested yields. Field 3, it may be added, has just maintained its assessment.

Non-resident tappers, Sinhalese from villages close by, were employed to tap the above fields. Their attendance varied from 96 to 99 per cent of the possible. Planters in Ceylon are now familiar with the now famous or infamous clause of normal absence of labour in the Restriction Act, whereby, for no other fault than the employment of an out-turn of labour above 85 and 90 per cent for non-resident and resident categories, assessments are brought down to correspond to crops brought by the stipulated 85 and 90 per cent of the possible tappers. The unfortunate wording of the clause is probably responsible for this debacle. The standard is certainly not wrong when applied to estates generally employing a sub-normal attendance of labour. The tragedy of the wording comes in when it allows the scrapping of crops delivered by attendance above 85 or 90 per cent set in the clause.

Recently, a system of latex measurement of each tree in 5 acres and field 3 once in a month, with a measuring glass designed to read the pounds per tree per annum on the day's latex, has been adopted. The results seem to be extremely interesting and further comment is deferred till next year.

8. Interested Planters who wish to see the above clearings and the methods adopted therein will be afforded all assistance.

PLANTING NOTE

APPLICATION OF TAR TO YOUNG BUDDED TREES

IN the "Handbook of Rubber Planting (Ceylon)," compiled by the Rubber Research Scheme for issue by the Ceylon Government, it is stated on p. 53 that "tar applied to the base of young trees acts as a deterrent* and does not injure the bark." A case has recently been investigated in which the application of tar to the bark of two year old budded plants, which had recently been pollarded to induce branching, led to the death of the plants within a few weeks. Plants carrying a normal head of foliage remained healthy but there was evidence of an adverse effect on the treated bark. Previous experience has shown that similar but more severe damage may result from the application of water-proof fungicidal preparations.

It is now strongly advised that tar and greasy preparations should not be applied to the bark of young plants. There is, however, no objection to their use as wound dressings.

The latest available information on the control of rats, which are causing serious damage to young plants in some areas, is given in Rubber Research Scheme Advisory Circular No. 14. This circular was issued to all estates on the R. R. S. publications register towards the end of 1940.

T. E. H. O'B.

* To porcupines.

MEETINGS

RUBBER RESEARCH SCHEME (CEYLON)

Minutes of the fifty-fifth meeting of the Rubber Research Board held at Dartonfield Estate, Agalawatta, at 10 a.m. on Monday, 20th January, 1941.

Present : Mr. M. Crawford (in the chair), Mr. T. Amarasuriya, Mr. W. P. H. Dias, J.P., Mr. L. M. M. Dias, Mr. G. E. de Silva, M.S.C., Mr. T. C. A. de Soysa, Mr. J. D. Farquharson, Mr. L. P. Gapp, Mr. F. H. Griffith, M.S.C., Mr. R. C. Kannangara, M.S.C., Mr. J. C. Kelly, Mr. F. A. Obeyesekere, and Mr. N. D. S. Silva, O.B.E., J.P.

Mr. T. E. H. O'Brien, Director, was present by invitation.

Apologies for absence were received from Messrs. R. J. Hartley, S. Phillipson (Deputy Financial Secretary), E. C. Villiers, M.S.C., and E. W. Whitelaw.

1. Minutes.

Draft minutes of the meeting held on 28th October, 1940, which had been circulated to members, were confirmed and signed by the Chairman.

2. Board.

The Chairman reported that as Acting Director of Agriculture he had assumed duties as Chairman of the Board with effect from November 11th, 1940.

He welcomed Mr. S. Phillipson, C.C.S., Deputy Financial Secretary, who had been deputed by the Financial Secretary to represent him on the Board with effect from 7th December, 1940.

The Chairman referred to the valuable services rendered to the Board by Mr. C. H. Collins during his long period of office and proposed that the Board's appreciation of his services be placed on record. Carried with applause. The Director said he was personally very grateful to Mr. Collins for advice given on matters referred to him.

3. Experimental Committee.

Recommendations made at meeting held on December 17th, 1940 :—

Labour Force at Dartonfield.—Decided to provide 4 cottages for Ceylonese labourers. The Committee was asked to submit estimates for 2 single and 2 semi-detached cottages. It was also decided to provide kitchen hearths in the line rooms at Dartonfield and Nivitigalakele at a cost of Rs. 1,380.

Accommodation for Junior Staff.—Decided to build one additional junior staff bungalow at Dartonfield during the current year, at a cost of Rs. 4,157.

Junior Staff.—Decided to postpone consideration of the appointment of a Chemical Assistant owing to the impending departure of the Chemist on military service.

A Sub-Committee was appointed to consider the salaries and terms of service of the junior staff. The following were nominated to serve on the Committee : the Deputy Financial Secretary, Mr. F. A. Obeyesekere, Mr. L. P. Gapp, and the Director.

Extension of Selection and Breeding Work :—

Consideration was given to a memorandum embodying proposals for the extension of selection and breeding work, involving an expenditure of approximately Rs. 300,000, spread over a period of 12 years. After discussion it was decided to apply to Government for an area of approximately 1 square mile of Crown land to be leased to the Research Scheme, to enable the extended programme of work to be undertaken.

Rubber Planting in Dry Districts.—Arising from an enquiry on the subject of Rubber planting in dry districts, the Director was instructed to prepare a memorandum embodying the Board's view that it is unsound to encourage the planting of Rubber in any district in which the climate is not well suited to this crop.

4. Smallholdings Committee.

Recommendations made at meeting held on January 10th, 1941.

Co-operative Societies.—Decided to give the fullest support to proposals for encouraging the development of co-operative societies for Rubber smallholders, and that a trial be made in the first place by endeavouring to establish a Rubber section in an existing society.

Coagulants.—Consideration was given to the situation arising from the use of sulphuric acid as an adulterant for acetic and formic acids, and as the basis of proprietary coagulants which are sold to smallholders at an unfair price. Decided to recommend, as has been done in Malaya, that regulations be issued prohibiting the import of sulphuric and other mineral acids, except under licence. The recommendation was approved that the Rubber Instructors should try to persuade village dealers to stock acid supplied by firms whose product is known to be satisfactory, and should advise smallholders to buy their acid from dealers who do so.

It was also decided to recommend that steps should be taken to have stocks of acetic and formic acid brought under control while supplies are plentiful, in order that price or other restrictions could be imposed without delay in the event of a shortage developing at any time.

Rubber Rollers for Smallholders.—Decided to import two rubber rollers from Malaya for trial, at a cost of Rs. 250.

5. Accounts.

(a) Statement of Receipts and Payments of the Board for the quarter ended 30th September, 1940 was approved.

(*b*) Dartonfield and Nivitigalakele accounts for August, September and October, 1940, were tabled.

(*c*) *Fixed Deposits* —

Renewals.—The Chairman reported the renewal of the following fixed deposits :—

1. Rs. 35,000 at the Mercantile Bank of India renewed with the Bank of Ceylon at 1¾ per cent interest for 12 months from 23rd December, 1940.
2. Rs. 50,000 at the National Bank of India Ltd. renewed at 1¾ per cent interest for 12 months from 31st December, 1940.

New Deposit.—Reported that Rs. 10,000 was placed in fixed deposit at the Bank of Ceylon at 1¾ per cent interest for twleve months from 16th December, 1940.

6. Staff.

(*a*) Reported that Mr. T. E. H. O'Brien had returned to the Island on 1st December, and resumed duties as Director with effect from 4th December, 1940.

(*b*) *Re-engagement of Mr. R. K. S. Murray.*—Reported that Mr. Murray's period of engagement was due to expire on 31st December, 1941. Mr. Murray's application for leave from 1st May (approx.) was approved and it was decided that he be offered re-engagement on the terms laid down for officers recruited from abroad.

(*c*) *Mr. M. W. Philpott.*—Reported that permission had been granted to Mr. M. W. Philpott to volunteer for military service, in accordance with the Board's decision of 10th June, 1940. Mr. Philpott had been accepted for service in the R.A.F. and would shortly be leaving Ceylon.

(*d*) *Junior Staff.*—Reported the following appointments :—

(a) Mr. A. K. J. Abeysinghe as a clerk in the head office.

(b) Mr. S. D. David as assistant estate clerk.

7. Cess Collections.

After discussion it was decided not to proceed with the proposals for stabilising the Board's income from Cess collections, in view of the adverse opinion expressed by one of the associations to which the proposals had been circulated for comment.

8. Progress Report.

The Acting Director's Report for the 3rd Quarter, 1940 was adopted.

9. Patents.

Arising from a recommendation made at the Conference of Directors of Rubber Producers' Research Organisations, held in 1940, the Board considered and decided on general lines of policy in regard to the provision of patent protection for useful discoveries made by Research Scheme Officers.

10. Publications

The *Third Quarterly Circular* for 1940 was tabled.

Research Laboratories,
Dartonfield, Agalawatta,
10th February, 1941.

RUBBER RESEARCH SCHEME (CEYLON)

Minutes of the fifty-sixth meeting of the Rubber Research Board held at the Chamber of Commerce, Colombo, at 2-30 p.m. on Monday, 21st April, 1941.

Present: Mr. E. Rodrigo (in the chair), Mr. C. E. Jones (Deputy Financial Secretary), Mr. T. Amarasuriya, Mr. W. P. H. Dias, J.P., Mr. L. M. M. Dias, Mr. T. C. A. de Soysa, Mr. J. D, Farquharson, Mr. L. P. Gapp, Mr. R. C. Kannangara, M.S.C., and Mr. F. A. Obeyesekere.

Mr. T. E. H. O'Brien, Director, was present by invitation.

Apologies for absence were received from Messrs. J. A. S. Agar, F. H. Griffith, M.S.C., R. J. Hartley, N. D. S. Silva, O.B.E,, J.P., E. C. Villiers, M.S.C., and E. W. Whitelaw.

1. Minutes.

(a) Draft minutes of the meeting held on 20th January, 1941, which had been circulated to members, were confirmed and signed by the Chairman.

(b) Matters arising from the minutes :—

Coagulants.—Reported that new legislation would be required before the import of sulphuric and other mineral acids could be controlled. After discussion it was decided that further action in the matter be postponed, and that propaganda for discouraging the use of proprietary coagulants be undertaken by the Smallholdings Department.

2. Decision by Circulation of Papers.

Training of Rubber Tappers.—Reported that, as approved by circulation of papers, a memorandum had been sent to the Minister for Labour, Industry and Commerce expressing the view that Rubber tappers could not usefully be trained at Dartonfield.

3. Board.

The Chairman reported the following changes in membership since the last meeting :—

(a) Resumption of duties as Chairman by Mr. E. Rodrigo from 25th February, 1941.

(b) Nomination of Mr. C. E. Jones, Deputy Financial Secretary, in place of Mr. S. Phillipson, from 19th February, 1941.

(c) Renomination of Mr. E. C. Villiers as one of the representatives of the State Council for a further period of three years from 16th February, 1941.

(d) Renomination of Mr. L. P. Gapp by the Ceylon Estates Proprietary Association for a further period of three years from 1st April, 1941.

(e) Nomination of Mr. J. A. S. Agar by the Ceylon Estates Proprietary Association to act for Mr. J. C. Kelly during the latter's absence from the Island with effect from 3rd April, 1941.

4. Employees' Provident Fund.

On the proposal of the Chairman it was decided that the Board should resume the administration of the Fund under the old rules, subject to a change in the rate of contribution from 5 to 7½ per cent. Amendments to Rules 3(i) and 3(ii) were also approved.

5. Experimental Committee.

Recommendations made at meeting held on 17th March, 1941 :—

(a) Export of Latex.—Decided to increase the year's output of preserved latex from Dartonfield to 40,000 lbs. (dry rubber), including 20,000 lbs. to be purchased from outside estates. A vote of Rs. 8,500 was approved to meet the extra expenditure.

(b) Estate Cart Road.—Decided to accept the offer of the Kalutara D.R.C. to metal, tar, and maintain the approach road, subject to the payment of a first and final contribution of Rs. 6,550 towards the cost of the work. It was also decided to accept the contribution offered by Gallawatta Estate towards the cost of the work.

(c) Over-expenditure of Estate Votes.—Covering sanction was given for the over-expenditure of Rs. 3,696 on estate votes in 1940.

(d) Buildings.—The following votes were approved :—

Double cottage for Ceylonese labourers with well and 2 latrines	...	Rs. 1,651
Extension of bungalow servants' quarters (2 rooms)	...	„ 827
Manure shed at Nivitigalakele (supplementary)	...	„ 67
Water tank at Nivitigalakele	...	Rs. 350

(e) Exchange of Clones with Proefstation West Java.—A proposal made by the Proefstation West Java, for the exchange of new clones between the two Institutes, was approved in principle.

(f) Clone Museum at Kepitigalla Estate.—Noted that the proposal for the establishment of a clone museum at Kepitigalla Estate had been approved by the Directors of the Kepitigalla Estate Co. The Director was authorised to arrange for an area of eight acres to be replanted during the N.E. planting season, subject to approval of the estimates by the Experimental Committee.

(g) Verification of Stores 1940.—The Director's report on the verification of stores, 1940, was adopted.

(h) Malaria Control Scheme.—Agreed that the Board should continue to subscribe to the Malaria Control Scheme on an annual basis.

6. Smallholdings Committee.

Minutes of the meeting of the Smallholdings Committee, held on 18th March, 1941, were adopted.

7. Accounts.

(a) Statement of Receipts and Payments of the Board for the quarter ended 31st December, 1940, was approved.

(b) Balance Sheet and Auditors' Report for 1940 was approved, and it was noted that the surplus at the end of 1940 was Rs. 215,006.

(c) Excess Expenditure and Savings on Votes.—The statement of Excesses and Savings on votes for 1940 was approved, and covering sanction granted for excess expenditure amounting to Rs. 9,467.

(d) Dartonfield and Nivitigalakele accounts for November and December, 1940 and January, 1941 were tabled.

(e) Investment of Rs. 40,000.—The Chairman reported that Rs. 40,000 had been invested in the Ceylon Government 2½ per cent War Loan 1948.

(f) Fixed Deposits.—The Chairman reported the renewal of the following fixed deposits :—

1. Rs. 30,000 at the Chartered Bank of India, Australia and China for 12 months from 5th February, 1941 at 1¾ per cent per annum.

2. Rs. 15,000 at the Bank of Ceylon for 12 months from 10th April, 1941, at 1¾ per cent per annum.

(g) Supplementary Votes.—The following supplementary votes were passed, to meet the cost of works approved at the meeting held on 20th January, 1941 :—

Junior Staff Bungalow at Dartonfield	Rs. 4,500
Kitchen hearths in labourers' quarters at Dartonfield and Nivitigalakele	„ 1,380

8. Reports

(a) Director's Report for the quarter ended 31st December, 1940, was approved.

(b) Annual Report for 1940, was approved and it was agreed that it should be published as usual.

9. Staff.

(a) Mr. R. K. S. Murray.—Reported the departure of Mr. R. K. S. Murray on leave for 8 months from April 16th. Arrangements were made for carrying on the work of the Botanical and Mycological Department during his absence.

(b) Mr. M. W. Philpott.—Reported that the departure of Mr. M. W. Philpott on miiltary service had been cancelled, on official representations that his technical services were likely to be required in Ceylon.

(c) Junior Staff :—

(a) Appointments.—The appointment of one Rubber Instructor (new appointment) and one Laboratory Assistant (replacement) were reported.

(b) War Allowance.—An interim report of the Committee appointed to consider the salaries and terms of service of the Junior Staff was considered, and it was decided that a war allowance, on the terms approved for Government servants, be paid to officers in receipt of a monthly salary of Rs. 100 or less, with effect from March 1st, 1941.

10. London Advisory Committee for Rubber Research (Ceylon and Malaya).

(a) Annual Contribution.—Decided that the Board's contribution, at the present rate of £875 per annum, be continued on a yearly basis from 1942.

(b) Changes in Membership.—The following changes were reported :—

Advisory Committee :—

1. Dr. H. A. Tempany nominated by the Colonial Advisory Council of Agriculture and Animal Health in succession to Sir Frank Stockdale.

2. Death of Sir Herbert Wright, one of the representatives of Ceylon planting interests. It was decided to record the Board's appreciation of the services of Sir Herbert to the Ceylon Rubber industry.

Technical Sub-Committee :—

1. Death of Mr. B. D. Porritt.

2. Dr. S. Pickles appointed in place of Mr. W. C. Smith who had resigned.

The meeting terminated with a vote of thanks to the Chamber of Commerce for the use of their room.

Research Laboratories.
Dartonfield. Agalawatta
6th May. 1941

London Advisory Committee for Rubber Research (Ceylon and Malaya).

Member nominated by the Colonial Advisory Council of Agriculture and Animal Health:

Dr. H. A. Tempany, C.B.E.

Member nominated by the Government of Ceylon:

VACANT

Member nominated by the Governments in British Malaya:

Mr. J. Lornie, C.M.G.

Members representing Malayan Planting interests—nominated by the Rubber Growers' Association:

Mr. P. J. Burgess (Chairman).
Mr. J. L. Milne.
Mr. Eric Macfadyen.

Members representing Ceylon Planting interests—nominated by the Rubber Growers' Association:

Mr. G. H. Masefield.
Mr. George Brown

Member representing Manufacturing interests:

Lieutenant-Colonel J. Sealy-Clarke.

Ex-Officio Members:

Sir H. A. F. Lindsay, K.C.I.E., C.B.E., Director of the Imperial Institute.
Professor V. H. Blackman, Director of the Botanical Laboratories, Imperial College of Science and Technology.
Dr. S. P. Wiltshire, Director of the Imperial Mycological Institute.
Sir John Russell, O.B.E., Director of the Rothamsted Experimental Station.

Secretary:

Mr. J. A. Nelson, B.Sc.

The Technical Sub-Committee consists of members of the Advisory Committee with the following co-opted Members:

Mr. G. Martin (Superintendent of Rubber Investigations).
Mr. G. E. Coombs.
Mr. G. G. Balazs.
Mr. H. N. Ridley
Dr. Samuel Pickles
Dr. H. P. Stevens
Dr. D. F. Twiss
Prof. R. G. H. Clements

STAFF.

Mr. G. Martin, B.Sc. A.I.C., F.I.R.I.
Mr. H. C. Baker, M.Sc., A.I.C., A.I.R.I.
Mr. W. G. Wren, B.Sc., A.R.C.S.

RUBBER RESEARCH SCHEME (CEYLON)

LIST OF PUBLICATIONS FOR SALE

Bulletin No. 1-20. Bound volume, **Rs. 5·00. Later Bulletins Re.1·00** per copy

No. 1. The Effect of Tapping on the Movements of Plant-Food in *Hevea Braziliensis*

No. 2. The Effect of Tapping on the Movements of Plant-Food in *Hevea Braziliensis*

No. 3. Seasonal Variations in the Movements of Plant-Food in *Hevea Braziliensis*, Part I.

No. 4. The Physiological Effects of Various Tapping Systems, Part I.

No. 5. Progress Report on Vulcanization Tests.

No. 6. The Physiological Effects of Various Tapping Systems, Part II.

No. 7. The Physiological Effects of Various Tapping Systems, Part III.

No. 8. Seasonal Variations in the Movements of Plant-Food in *Hevea Braziliensis*, Part II.

No. 9. Vulcanization Tests.

No. 10. Vulcanization Tests.

No. 11. Variability in Rubber Manufacture

No. 12. Progress Report of the Rubber Research Chemist.

No. 13. Vulcanization Tests.

No. 14. On the Variation in the Number of Latex Vessels present in *Hevea Braziliensis*

No. 15. Vulcanization Tests.

No. 16. On the Natural Clotting of Rubber Latex.

No. 17. Vulcanization Tests.

No. 18. Measurements of " Bark Renewal"

No. 19. Vulcanization Tests

No. 20. Vulcanization Tests

No. 21. Vulcanization Tests 1919

No. 22. Vulcanization Tests 1919

No. 23. Vulcanization Tests 1920

No. 24. Valcanization Tests 1920

No. 25. Investigations on Samples of Plantation Para Rubber from Ceylon. 1921

No. 26. Result of Trials of Ceylon Plantation Rubber for the Manufacture of Ebonite 1921

No. 27. Investigations on Samples of Plantation Para Rubber from Ceylon, 1921

No. 28. Investigations on Samples of Plantation Para Rubber from Ceylon. 1922

No. 29. Summary of the Principal Results Obtained from Investigations into the Properties of Ceylon Plantation Rubber in Relation to its Method of Preparation. 1922

No. 30. The Penetration of Disinfectant on the Tapping Cut of *Hevea Braziliensis* 1922

No. 31. On the Occurrence " of Rust " on Sheet Rubber. 1923

No. 32. On the Preservation of Latex. 1924

No. 33. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 34. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 35. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 36. Investigations on Samples of Plantation Para Rubber from Ceylon. 1924

No. 37. Investigations on Samples of Plantation Para Rubber from Ceylon 1924

No. 38. Investigations on Samples of Plantation Para Rubber from Ceylon. 1925

No. 39. Do (Final Report Series I) 1925

No. 40. Do Series II 1926

No. 41. Do First Interim Report on Artificial Ageing Tests. 1926

No. 42. On the Smoking of Sheet Rubber in Relation to Mould Prevention. 1926

No. 43. The Inter-Relationship of Yield and the Various Vegetative Characters in *Hevea Braziliensis* (out of print). 1926

No. 44. The Construction of Smokehouses for Small Rubber Estates (out of date 1926

No. 45. The Efficiency of Disinfectants and Fungicides. 1927

No. 46. The Control of Bark Rot by Disinfectants. 1927

No. 47. Report on Variability of Ceylon Estate Grades. 1927

No. 48. Brown Bast and its Treatment. 1928

No. 49. Report on Causes of Variation in Plasticity. 1928

No. 50. Crepe Rolling. 1929

No. 51. The Curing of Sheet Rubber. 1930

No. 52. The Preparation of Uniform Rubber. 1932

No. 53. Oidium Leaf Disease 1936

No. 54. Report on a Visit to Malaya, Java and Sumatra. 1937

Booklets at Rs, 2-50 per copy.

Guide o the Preparation of Plantation Rubber. By T. E. H. O'Brien, M. Sc., A.I.C., Chemist

The Budding of Rubber. By R. A. Taylor, B.Sc., Physiological Botanist (out of date)

Diseases of Rubber in Ceylon. By R. K. S. Murray, A.R.C.Sc., Mycologist.

Copies of the following publications of the Rubber Research Institute of Malaya are available at the prices indicated :—

Planting Manual No. 4—Latex Preservation and Shipment. **Rs, 3-50**